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Barriers to Advanced Technology Adoption (AI/Cloud) in Small and Medium Enterprises in Developing Oceania Nations

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Abstract

This study qualitatively identifies and analyses the primary mechanisms impeding the adoption of advanced technologies, specifically Artificial Intelligence and Cloud Computing, among Small and Medium-sized Enterprises in developing Oceania nations, with empirical grounding in the operational realities of entrepreneurs in Papua New Guinea, Fiji, Vanuatu, and the Solomon Islands. While foundational information systems have achieved partial penetration in these economies, the transition to higher-order digital technologies remains structurally inhibited by a complex, interacting cluster of barriers that existing technology adoption frameworks, most notably the Technology Acceptance Model and Diffusion of Innovations theory, inadequately capture in their original metropolitan formulations. Employing Grounded Theory methodology, the study constructs an inductively derived theoretical model of advanced technology adoption barriers through in-depth interviews with 50 SME owners, managers, and operators across the four focal countries. The emergent model identifies six primary barrier categories: infrastructural deficits and connectivity unreliability; prohibitive financial costs relative to SME revenue scales; acute digital skills scarcity at both operator and workforce levels; deficient institutional and regulatory environments; misalignment between commercially available technology offerings and local business process realities; and a culturally embedded risk aversion rooted in communal economic obligations and relational trust networks. Critically, the study investigates the role of entrepreneurial ecosystems in mediating technology adoption, finding that community-based initiatives, including peer learning networks, informal technology co-operatives, and diaspora knowledge transfer channels, consistently demonstrate higher adoption facilitation effectiveness than public sector digital economy programmes or private sector vendor-led initiatives, a finding attributed to their superior contextual legitimacy, relational trust architecture, and adaptive responsiveness to local barrier configurations. The study's emergent theoretical model, termed the Oceania SME Digital Transition Framework (OSDTF), provides a replicable analytical instrument for policymakers, development practitioners, and technology providers seeking to design contextually appropriate advanced technology adoption interventions in small island developing state economies.

Keywords: SME Technology Adoption, Artificial Intelligence, Cloud Computing, Oceania, Grounded Theory, Entrepreneurial Ecosystem, Digital Transformation, Developing Nations, Small Island Developing States, Community-Based Innovation.

1. INTRODUCTION

The global discourse on digital transformation has, for the better part of two decades, constructed a narrative of technological inevitability a teleological progression in which enterprises of all scales and geographies are assumed to be advancing along a convergent adoption trajectory toward cloud, native operations, data, driven decision, making, and AI, augmented business processes. This narrative is empirically misleading in many contexts. Still, it is nowhere more systematically at odds with observable economic reality than in the Small and Medium Enterprise (SME) sectors of the developing economies of Oceania. The island nations of the Pacific encompassing Papua New Guinea, Fiji, Vanuatu, the Solomon Islands, Tonga, Samoa, Kiribati, and numerous smaller territories collectively constitute a region in which the SME sector forms the primary engine of employment and livelihood generation, accounting for an estimated 90% or more of all formal business registrations and the majority of non, agricultural private sector employment in most jurisdictions (ADB, 2020). Yet this economically central sector remains, in the most substantive sense, digitally peripheral not merely in terms of infrastructure access, but in terms of the institutional, financial, cognitive, and cultural preconditions that genuine advanced technology adoption requires.

The distinction between foundational information systems adoption comprising basic accounting software, mobile money platforms, and social media, based marketing, and the adoption of advanced technologies such

as Artificial Intelligence (AI) and Cloud Computing is analytically critical and yet frequently elided in both the development economics literature and in national digital economy strategy documents across the Oceania region. Foundational IS adoption, while imperfect in its penetration, has been substantially accelerated by the widespread availability of low-cost smartphones, the expansion of mobile data networks under Pacific telecommunications liberalisation programmes, and the organic adoption of platforms such as WhatsApp, Facebook, and mobile banking applications that require minimal technical literacy and deliver immediate, tangible operational benefits (Heeks, 2018). Advanced technology adoption, by contrast, requires qualitatively different preconditions: stable, high, bandwidth internet connectivity; computational infrastructure either on, premises or reliably accessible via cloud platforms; substantial capital investment in software licensing, implementation, and customisation; a workforce with meaningful digital technical skills; and, critically, a business process environment sufficiently formalised and data, rich to generate the operational inputs from which AI and cloud, based analytics can extract actionable value (Venkatesh et al., 2016). These preconditions are simultaneously more demanding and more unevenly distributed than those for foundational IS adoption, and their absence in the Oceania SME context creates a structural barrier to advanced technology uptake that is not resolved by the mere availability of these technologies.

The existing theoretical literature on technology adoption in developing economy contexts has been substantially shaped by adaptations of the Technology Acceptance Model (Davis, 1989) and Rogers' (2003) Diffusion of Innovations framework, as well as by the Unified Theory of Acceptance and Use of Technology (UTAUT) developed by Venkatesh et al. (2003). While these frameworks have generated substantial empirical insights in Asian, African, and Latin American contexts, their application to the Pacific Oceania small island developing state (SIDS) context reveals systematic theoretical gaps. Most significantly, these models were constructed on the assumption of individual rational agency; the decision to adopt or not adopt a technology is modelled as a function of the individual user's perception of usefulness, ease of use, and social influence. In the communal economic contexts that characterise many Pacific Island societies, however, technology adoption decisions are frequently not individual but collectively negotiated, embedded in networks of wantok (extended kinship and community obligation) that create both social resources for adoption support and powerful social constraints on individual risk, taking, and capital commitment (Curry & Koczberski, 2009). The relational texture of Pacific business culture demands a theoretical framework that treats the entrepreneurial ecosystem as the network of social relationships, community institutions, and shared norms within which SMEs operate as a primary analytical unit rather than a background condition.

This study is motivated by the observation that the most effective interventions for advancing advanced technology adoption among Pacific Oceania SMEs documented in the practitioner and development literature have consistently been community-based rather than government-, programme-, vendor-, or vendor-driven. Informal peer learning networks, diaspora, facilitated knowledge transfer, industry association technology circles, and community-based entrepreneurship hubs have repeatedly demonstrated higher adoption facilitation outcomes than formal government digital economy programmes, whose effectiveness is constrained by bureaucratic rigidity, political discontinuity, and a tendency to design interventions around metropolitan technology norms rather than local business realities (Hollow, 2014; Tongia & Wilson, 2011). Understanding why this pattern persists and which institutional and relational characteristics of community-based initiatives make them more effective adoption facilitators in the Pacific Oceania context is a central objective of this research and one of its most policy-consequential contributions.

Methodologically, the study employs a Grounded Theory approach (Strauss & Corbin, 1998; Charmaz, 2014) and conducts in-depth interviews with 50 SME owners, managers, and operators across Papua New Guinea, Fiji, Vanuatu, and the Solomon Islands to construct an inductively derived theoretical model of advanced technology adoption barriers. The choice of Grounded Theory is epistemologically motivated by the absence of a pre-existing theoretical framework adequate to the specific structural and cultural configuration of the Pacific Oceania SME context. Rather than testing a pre-specified set of hypotheses derived from metropolitan adoption models, the study allows the theoretical structure to emerge from participants' own accounts of their experiences. Barriers to advanced technology adoption, producing a model that is genuinely grounded in the lived realities of Pacific Island entrepreneurs rather than imposed from a context or external theoretical tradition. The emergent theoretical framework, the Oceania SME Digital Transition Framework (OSDTF), is offered as a contribution to both the comparative digital economy literature and the practical toolkit of development practitioners and policymakers working to advance digital transformation in the Oceania SIDS context.

2. METHODOLOGY

The study adopts a Constructivist Grounded Theory methodology as developed by Charmaz (2014). This approach treats theoretical categories as constructed through the researcher's interpretive engagement with participant data rather than as objective properties discovered through neutral observation. This epistemological positioning is appropriate for the research context because the barriers to advanced technology adoption experienced by Pacific Oceania SME operators are not simply technical or economic facts that can be measured through standardised instruments; they are socially constructed realities embedded in specific cultural, institutional, and relational contexts that demand a hermeneutically sensitive analytical framework. The methodology unfolds across four interconnected procedural phases: participant selection and sampling, data collection through in-depth interviews, iterative data analysis through constant comparative coding, and theoretical saturation and framework construction.

2.1. Participant Selection and Theoretical Sampling

A theoretical sampling strategy, the defining sampling logic of Grounded Theory, in which participant selection is guided by emerging theoretical categories rather than predetermined demographic quotas, was employed to construct the study's 50-participant sample (Strauss & Corbin, 1998). The sample encompasses SME operators from four focal countries: Papua New Guinea (n=15), Fiji (n=14), Vanuatu (n=11), and the Solomon Islands (n=10), with the sample distribution reflecting the relative size and structural complexity of each national SME sector rather than equal representation. Four country contexts were selected to capture the substantial variation in SME operating environments within the Oceania developing nation context: Papua New Guinea represents the region's most populous and economically complex developing economy, with an extraordinarily diverse linguistic and cultural substrate and the most acute infrastructure deficits; Fiji represents the region's most economically developed and institutionally mature SIDS, with the highest levels of ICT infrastructure and the most developed formal SME support ecosystem; Vanuatu offers an intermediate case combining a moderately developed tourism, dependent economy with significant geographical and linguistic fragmentation; and the Solomon Islands presents a context of acute post, conflict institutional fragility, high natural disaster exposure, and very limited digital infrastructure outside the capital Honiara.

Within each country, participants were recruited across three broad SME sectoral categories: retail and trade; hospitality, tourism, and services; and agriculture, based processing, and export to ensure that the emergent theoretical model captures barrier configurations relevant to the primary economic activities in which Pacific Oceania SMEs are concentrated. The unit size criterion for SME classification followed the Pacific Island Forum Secretariat's operational definition of enterprises with between one and 100 employees and annual revenue below a nationally calibrated threshold. Recruitment was facilitated through established institutional networks of the University of Wollongong's Pacific Digital Futures research partnership programme, national chambers of commerce, and Small Business Development Corporation equivalents in each focal country. Purposive variation within theoretical sampling ensured representation across gender, urban and rural location, enterprise age, and prior technology adoption experience categories, as these dimensions were hypothesised and subsequently confirmed through early-stage coding to be theoretically consequential in shaping barrier profiles.

2.2. Data Collection: In-Depth Interview Protocol

Primary data were collected through semi-structured in-depth interviews of 60 to 120 minutes' duration, conducted in person where logistically feasible and via video call for remote participants in outer-island locations where travel costs were prohibitive. All interviews were conducted in English, with the option of an interpreter; facilitated interviews in Tok Pisin for Papua New Guinea participants with limited English proficiency. Three interviews in the PNG sample were conducted with interpreter support. The interview protocol was designed to elicit rich, experience, grounded narrative accounts rather than structured responses to fixed stimuli, employing an initial open-ended question sequence Tell me about your experience with digital technology in your business, '' and 'What has been your experience when you have tried or considered using more advanced digital tools?' followed by theoretically directed probing questions as the interview progressed. As the theoretical sampling strategy progressively identified emergent categories requiring deeper investigation, the interview protocol was iteratively adjusted to include more targeted questions exploring the specific dimensions, notably the role of community networks, the experience with government programmes,

and the relationship between cultural obligation and investment risk tolerance, that were generating the most theoretically productive data in earlier interviews.

All interviews were audio-recorded with participants' written informed consent. Recordings were transcribed verbatim, with nonverbal and paralinguistic features noted in the transcript where analytically relevant. Ethical approval was obtained from the University of Wollongong Human Research Ethics Committee (HREC) before data collection, and participants' institutional affiliations and identifying business details have been anonymised in all analytical outputs. Given the sensitivity of financial and competitive information shared by some participants during interviews, a data sovereignty protocol was established that guaranteed participants the right to review and withdraw specific excerpts from the analytical dataset before publication.

2.3. Data Analysis: Constant Comparative Coding

Data analysis proceeded through the three-stage coding process canonical to Grounded Theory methodology: initial coding, focused coding, and theoretical coding (Charmaz, 2014). Initial coding involved line-by-line examination of interview transcripts, generating descriptive codes that captured participants' reported experiences, attributions, and orientations toward advanced technology in their own conceptual vocabulary. Focused coding consolidated the most analytically productive initial codes into higher-order categories through constant comparison, the systematic comparison of each new data item against all previously coded items to identify structural similarities and differences. The constant comparative procedure was continued across successive interviews and successive analytical iterations until theoretical saturation was achieved: the point at which new interview data ceased to generate new theoretical categories or substantially modify the properties of existing categories (Strauss & Corbin, 1998). Theoretical saturation was reached, in the primary researcher's judgment, at approximately the 44th interview, with the final six interviews serving primarily to confirm and deepen rather than extend the emerging theoretical structure. NVivo 14 software was used to manage the coding dataset, though all interpretive decisions were made by the researcher rather than algorithmically.

Theoretical coding, the final analytical stage in which relationships between the focused categories are identified and articulated as a coherent theoretical framework, was conducted through iterative memo writing and diagrammatic modelling. The relationships between the six primary barrier categories that emerged from focused coding, and between those categories and the mediating role of the entrepreneurial ecosystem, were progressively mapped and refined until a theoretically coherent, empirically grounded model, the Oceania SME Digital Transition Framework, was stabilised. The framework was subjected to member checking with a purposive sub-sample of 10 study participants, who confirmed the model's general face validity and provided several significant conceptual refinements that were incorporated into the final formulation.

3. RESULTS AND DISCUSSION

3.1. The Six, Barrier Configuration: An Emergent Taxonomy of Adoption Impediments

The constant comparative analysis of the 50 interview datasets produced a theoretically saturated six-category taxonomy of advanced technology adoption barriers. These six categories are not mutually exclusive analytical constructs; in the vast majority of participant accounts, they operate as a dynamically interacting cluster in which the configuration of the others conditions the salience and severity of each barrier. This interactive architecture is itself a theoretically significant finding, distinguishing the OSDTF from barrier taxonomies in the metropolitan SME technology adoption literature, which tend to treat individual barriers as independently addressable policy targets. In the Pacific Oceania context, the barriers constitute a systemic configuration: addressing any single barrier in isolation, without accounting for its interdependencies with the remaining five, is unlikely to yield durable adoption outcomes.

The first and most universally cited barrier category across all four country contexts is the infrastructural deficit and unreliability of connectivity. Every participant who had considered or attempted to deploy cloud-based services, including Software-as-a-Service platforms for accounting, inventory management, or customer relationship management, reported experiences of failed uploads, corrupted data synchronisation, or service outages during critical operational periods attributable to internet connectivity failures. In Papua New Guinea

and Vanuatu, participants in provincial and outer-island locations reported average daily internet downtime that rendered cloud-dependent business operations functionally unviable. A PNG retail operator summarised a near-universal frustration: the technology functions as advertised when one is connected, but the assumption of reliable connectivity embedded in the design logic of metropolitan cloud platforms does not map onto the Oceanian operational reality. This finding is consistent with the World Bank (2022) assessment that Oceania SIDS have among the highest broadband costs and the lowest reliability metrics of any developing region, with submarine cable outages as the primary international connectivity infrastructure for island nations, causing periodic complete service interruptions that can persist for days.

The second barrier category is financial cost prohibitiveness, operating through multiple interacting mechanisms. The direct cost of cloud platform subscriptions and AI-enabled software, typically priced in USD at rates reflecting metropolitan market valuations, represents a disproportionate burden for SMEs operating at Pacific Island revenue scales, where annual net revenues for many micro and small enterprises fall within ranges that render even modestly priced SaaS subscriptions a meaningful financial commitment. The indirect costs of advanced technology adoption, including device upgrades, ICT infrastructure enhancements, staff training, and implementation consulting, compound the direct subscription costs into a total adoption cost that exceeds the realistic investment capacity of the majority of study participants. Several participants described engaging in a preliminary research phase for cloud adoption that they abandoned upon encountering total cost estimates, noting that the payback horizon for the investment, assuming the technology performed as promised in their connectivity-constrained environment,

The third barrier category, acute digital skills scarcity, was identified as a critical bottleneck at two distinct levels: the owner and the owner/operator level. At the owner/operator level, a majority of participants across all four country contexts reported insufficient technical literacy to independently evaluate, configure, or troubleshoot advanced technology platforms. This dependency on external technical support, which is itself severely scarce and geographically concentrated in capital cities, creates a structural vulnerability in adoption trajectories: when technical problems arise, which in the Pacific connectivity environment they do with high frequency, the absence of local technical capacity to resolve them results in service abandonment rather than problem resolution. At the workforce level, the challenge is compounded by the structural thinness of the formal technical education sector in most Pacific SIDS, producing a labour market in which digitally skilled employees are simultaneously scarce and expensive, and in which the investment in upskilling employees creates a talent retention problem because newly acquired digital skills increase employee attractiveness to larger organisations and public sector employers with superior compensation capacity.

The fourth barrier, deficient institutional and regulatory environments, encompasses a cluster of governance-related impediments that emerged as particularly salient in the Papua New Guinea and Solomon Islands case contexts. These include the absence or nascency of data protection and cybersecurity regulatory frameworks that provide legal certainty for cloud data storage and AI, driven customer data processing; inconsistent and frequently updated business registration and taxation requirements that create administrative uncertainty for SMEs considering platform, dependent compliance tools; and the functional weakness of consumer protection and commercial dispute resolution institutions, which elevates the perceived risk of dependency on technology vendor relationships that can be difficult or impossible to enforce through formal legal channels in island state jurisdictions. Several participants explicitly connected this regulatory deficit to their risk calculus around advanced technology adoption, noting that the absence of data sovereignty protections equivalent to those available in Australian or New Zealand jurisdictions made them reluctant to store sensitive business and customer data on overseas cloud servers.

The fifth barrier category, technology/business process misalignment, proved to be among the most analytically rich and theoretically novel contributions of the study. Participants across all four countries described experiences in which commercially available AI and cloud platforms, while technically functional, were operationally irrelevant or actively counterproductive when applied to the specific business process configurations of Pacific Island SMEs. AI-driven demand forecasting tools designed for retail environments with stable supply chains and consistent consumer preference patterns generate analytically meaningless outputs when applied to Pacific island retail contexts characterised by sporadic and irregular supply availability, highly seasonal demand fluctuations driven by cultural event cycles, and consumer purchasing patterns strongly mediated by communal reciprocity obligations. Cloud-based HR management platforms assume employee classification systems, payroll structures, and performance management cultures derived

from metropolitan employment relationship norms that are substantially divergent from the informal, kin-, network-, and embedded employment relationships prevalent in many Pacific Oceania SME contexts. This finding suggests that the absence of contextually adapted technology offerings, products designed for, or genuinely configurable to, Pacific Island business process realities is not merely a market gap but a substantive structural barrier to adoption, one that technology vendors and development programme designers systematically underestimate.

The sixth and most culturally distinctive barrier category, culturally embedded risk aversion rooted in communal economic obligations, requires the most contextually sensitive analytical treatment. The concept of wantok obligations, present across the Pacific in various culturally specific forms, describes a network of reciprocal social obligations that bind individuals to contribute resources, including business capital, to the needs of extended family, clan, and community members. In the context of technology adoption, these obligations interact with investment risk tolerance in two analytically distinct ways. First, the capital that a Pacific Island SME owner might in principle be able to mobilise for technology investment is frequently obligated in advance to wantok claims, community ceremonies, family emergencies, school fees, and church commitments that diminish both the absolute amount of capital available for discretionary technology investment and the predictability of capital availability over the investment payback horizon. Second, the social consequences of business failure in a communal economic context, where failure is not merely a private financial setback but a social embarrassment that affects the status and credibility of the entrepreneur and their extended network, create a risk aversion calculus that is systematically more conservative than that of a metropolitan entrepreneur whose failure consequences are primarily private. Advanced technology investments, with their higher cost basis, longer payback horizons, and greater connectivity and dependence risk, are assessed against this communal risk threshold and are frequently found to be unjustifiable.

3.2. The Entrepreneurial Ecosystem as Mediating Architecture

The most theoretically productive and policy-consequential finding of this study, one that emerged consistently and with unusual conceptual clarity across the four country contexts, concerns the mediating role of the entrepreneurial ecosystem in modulating the severity and tractability of the six-barrier configurations. The concept of entrepreneurial ecosystem, as developed by Isenberg (2011) and subsequently elaborated by Mason and Brown (2014), describes the complex of cultural, institutional, resource, and network conditions within which entrepreneurial activity is embedded. In the Pacific Oceania context, the entrepreneurial ecosystem has a distinctive architecture that conventional ecosystem frameworks developed primarily in metropolitan innovation hub contexts do not adequately capture: it is simultaneously under, institutionalised in formal terms (thin in government agencies, formal financial institutions, and professional service providers) and richly elaborated in informal terms through the dense, multi, stranded social networks of community, kinship, religious affiliation, and professional association that constitute the primary relational substrate of Pacific business life.

The study's data reveal a consistent pattern across all four country contexts: advanced technology adoption outcomes are substantially better in terms of both initial adoption rates and sustained use among SME operators who are embedded in active peer learning networks with technology adoption experience than among those who rely primarily on formal government digital economy programmes or private sector vendor-initiated adoption pathways. Participants who described successful or partially successful advanced technology adoptions representing approximately 28% of the sample almost universally attributed a critical facilitation role to informal peer networks: a fellow business owner in the same market who had already navigated the implementation of a cloud accounting platform, a diaspora family member with IT sector experience in Australia or New Zealand who provided remote technical support, a church, based women's enterprise group that had collectively negotiated a discounted platform subscription and shared implementation expertise.

The theoretical explanation for this pattern, emerging from the Grounded Theory analysis, has three interconnected components. First, community-based peer networks possess contextual legitimacy that neither government programmes nor vendor-led initiatives can replicate: the advice and demonstrated practice of a community peer who has navigated the same barrier configuration within the same social and institutional context is assessed as far more credible than the generalised recommendations of a government digital economy workshop or a technology vendor's sales presentation. Second, peer-to-peer technology support in

Pacific Island communities operates through the trust architecture of the wantok network, which creates social accountability mechanisms, the obligation to help, and reputational consequences for failing to do so, absent from formal support relationships. Third, community-based initiatives are structurally more adaptive to the specific, localised barrier configurations that individual SMEs face: they can respond to particular connectivity problems in particular locations, particular financial constraints in particular industries, and particular cultural risk calculation challenges in particular community contexts, in ways that standardised government programme designs or commercial vendor support models cannot.

3.3. Why Public and Private Sector Initiatives Underperform: A Structural Analysis

The consistently documented underperformance of public sector digital economy programmes in facilitating advanced technology adoption among Pacific Oceania SMEs is not adequately explained by resource insufficiency alone, though resource constraints are undeniably real. The Grounded Theory analysis identifies three structural features of public sector programme design that systematically limit their adoption facilitation effectiveness in this context. The first is the adoption, as, awareness fallacy: the majority of national digital economy programmes and development, partner, funded ICT SME initiatives in the study countries concentrate their primary effort on awareness, raising activities workshops, technology demonstrations, and digital literacy training under an implicit theory of change that assumes the primary barrier to advanced technology adoption is insufficient awareness of what technologies are available and what they can do. The interview data comprehensively contradict this theory: not a single participant reported that awareness of AI or the availability of cloud technology was a barrier to their consideration of adoption. The barriers are structural, financial, relational, and contextual, not informational.

The second structural limitation of public sector programmes is what several participants described as the 'metropolitan template' problem: programmes designed by national government ICT agencies or international development partners tend to be modelled on digital economy support frameworks developed in Australia, New Zealand, or metropolitan global contexts, and applied to Pacific Island SME contexts without adequate adaptation to the specific barrier configurations those contexts present. Participants described attending government digital economy workshops where cloud platform demonstrations were conducted over high-speed broadband connections that bore no relationship to the connectivity realities of their operating environments, and where the recommended platforms were priced in USD at levels the workshop facilitators apparently had not calculated relative to local SME revenue scales. This disconnect between programme design assumptions and operational reality does not merely reduce programme effectiveness; it actively damages the credibility of government as an advanced technology adoption facilitator, reducing the likelihood that SME operators will engage with subsequent government initiatives.

The third structural limitation concerns institutional discontinuity: multiple participants described having commenced technology adoption pathways supported by a government programme or development partner initiative that was subsequently defunded, restructured, or administratively interrupted due to political changes, budget cycles, or project completion. The consequence of such discontinuity is not merely the loss of the specific support provided; it is the erosion of the trust and institutional confidence that are preconditions for sustained technology adoption engagement. In contrast, community-based peer networks do not face equivalent discontinuity risks: they persist because they are embedded in the social relationships and mutual obligations of the community, not in the administrative calendars of government programmes or the business models of commercial vendors.

3.4. The Oceania SME Digital Transition Framework (OSDTF)

The Oceania SME Digital Transition Framework that emerges from this Grounded Theory analysis consists of three interconnected theoretical propositions that together constitute a model of the advanced technology adoption process as it actually unfolds and fails to unfold in the Pacific Oceania SME context. The first proposition is the Structural Barrier Interdependence Thesis: the six primary barrier categories identified in this study function not as independent obstacles to be addressed serially but as a dynamically coupled system in which the presence of others amplifies the severity of any one barrier. This thesis has a direct policy implication: single, barrier interventions, connectivity improvements without skills development, skills development without cost subsidy, or cost subsidy without contextually appropriate technology offerings will not produce durable adoption outcomes because the unaddressed residual barriers will continue to generate

adoption failure. Effective intervention must address the barrier configuration systemically, with components that reinforce each other's effectiveness.

The second proposition is the Ecosystem Primacy Thesis: in the Pacific Oceania SME context, the entrepreneurial ecosystem, specifically its informal, community-embedded dimension, is the primary determinant of advanced technology adoption outcomes, more consequential than the severity of any individual barrier or any specific government or private-sector intervention. This proposition challenges the standard development economics approach to SME technology adoption, which treats the ecosystem as a background condition and focuses policy attention on specific demand- and supply-side barriers. The OSDTF treats the ecosystem as the primary policy lever: interventions that strengthen the community, based on peer learning networks, diaspora knowledge exchange channels, and the collective negotiating capacity of SME communities, will generate higher adoption returns per investment unit than interventions that target individual barriers without an ecosystem-strengthening component.

The third proposition is the Contextual Technology Fit Thesis: advanced technologies that are not adapted or configurable to the specific business process realities, connectivity constraints, and cultural-economic logics of Pacific Island SMEs will systematically yield lower adoption rates and higher abandonment rates, regardless of the quality of the supporting infrastructure provided. This thesis has a direct implication for technology providers seeking to expand in the Oceania market: the commercial opportunity in Pacific Island SME advanced technology adoption is not realised by deploying metropolitan, designed platforms in Pacific contexts; it requires genuine product adaptation investment that produces solutions capable of functioning effectively in low, bandwidth environments, at price points calibrated to Pacific Island revenue scales, and with feature sets designed around Pacific Island business process realities rather than metropolitan operational assumptions. Vendors unwilling to make this adaptation investment will continue to experience technology and business process misalignment, as documented in this study, with consequential reputational effects that make community-based adoption facilitation increasingly resistant to vendor-led approaches.

3.5. Policy Implications and Future Research Directions

The OSDTF generates several priority policy implications for the multiple stakeholder categories engaged with advanced technology adoption in the Pacific Oceania SME sector. For national governments and regional policy bodies including the Pacific Islands Forum Secretariat and the Pacific Community (SPC) the primary implication is the need for a structural reorientation of digital economy SME support from awareness, raising and infrastructure provisioning toward ecosystem activation: specifically, the investment of public resources in strengthening community, based technology peer networks, supporting diaspora knowledge exchange programmes, and funding the development of contextually adapted digital content and training resources that address the specific barrier configurations of Pacific Island business operators. This reorientation does not require abandoning infrastructure investment. The connectivity deficit identified in this study is real and consequential, and demands continued public investment. Still, it does require that infrastructure investment be conceived and implemented as a necessary but insufficient component of a systemic adoption facilitation strategy rather than as the primary intervention lever.

For international development partners, including the World Bank, Asian Development Bank, Australian DFAT, and New Zealand MFAT, the primary implication is the need to shift from project-based, limited SME digitalisation interventions toward sustained, institutionally embedded partnership approaches that operate at the ecosystem level rather than the individual programme level. Specifically, development partners should prioritise investment in the institutional capacity of national SME development bodies to design and manage contextually responsive adoption facilitation programmes, over the direct delivery of internationally designed programme templates. The evidence from this study suggests that the most cost-effective development partner investment in Pacific Island SME advanced technology adoption is likely to be investment in the Pacific diaspora knowledge exchange infrastructure, including platforms, networks, and events that connect Pacific Island SME operators with diaspora community members who possess technology sector expertise, because this investment amplifies existing community-based adoption facilitation capacity at relatively low cost.

Several important limitations of this study should be acknowledged in considering the generalisability of the OSDTF. The sample, while theoretically saturated within the four focal country contexts, does not represent the full diversity of the Oceania developing nation SME landscape; the exclusion of Tonga, Samoa, Kiribati,

and Micronesian states means that the framework's applicability to these contexts has not been empirically validated and requires further research. The study's exclusive reliance on owner and manager perspectives means that the technology adoption experiences of SME employees, whose digital skill levels and technology attitudes are consequential factors in adoption outcomes, Future research should also investigate the temporal dynamics of technology adoption in the Pacific Oceania context, examining whether SMEs that achieve initial advanced technology adoption sustain and deepen that adoption over time, or whether adoption abandonment which the present study identifies as a significant phenomenon but does not systematically analyse is the more common longitudinal outcome.

4. CONCLUSION

This Grounded Theory study has produced an inductively derived, empirically grounded theoretical model of the mechanisms impeding the adoption of advanced technology among Small and Medium Enterprises in developing Oceania nations, which substantively advances both the comparative digital economy literature and the practical knowledge base of development practitioners in this domain. The six-category barrier taxonomy infrastructural deficit, financial cost prohibitiveness, digital skills scarcity, regulatory deficiency, technology, business process misalignment, and culturally embedded risk aversion constitute a more structurally nuanced and contextually authentic account of advanced technology adoption impediments in the Pacific Island SME context than is available in existing framework adaptations derived from metropolitan or large, economically developing country contexts.

The study's most consequential finding, that community-based peer networks and informal ecosystem structures consistently outperform both public-sector programmes and private-sector vendor-led initiatives as advanced-technology adoption facilitators, has direct and actionable implications for the design and resourcing of digital-economy development interventions across the Oceania region. The theoretical explanation for this finding, grounded in the concepts of contextual legitimacy, relational trust architecture, and adaptive responsiveness to localised barrier configurations, provides development practitioners and policymakers with an analytically coherent basis for reorienting investment from programme delivery toward ecosystem strengthening, as the evidence demands. The persistence of the infrastructure, first and awareness, first design logics in public and development partner programmes, in the face of consistent evidence of their inadequacy, reflects not a genuine analytical disagreement about what works but rather institutional and political incentive structures that favour measurable and photographable outputs over the qualitatively complex and less visible outcomes of ecosystem development.

The Oceania SME Digital Transition Framework is offered as a contribution to resolving this disconnect, as a theoretically grounded, empirically validated instrument that can guide the design, evaluation, and adaptation of advanced technology adoption interventions toward the systemic, ecosystem-centered, contextually adaptive approach required by the Pacific Oceania SME context. As artificial intelligence and cloud computing become increasingly foundational to global business operations, the structural exclusion of Pacific Island SMEs from meaningful access to these technologies represents not merely a development deficit but a deepening asymmetry in the global distribution of economic opportunity. Addressing this asymmetry requires not the application of metropolitan technology adoption frameworks to Pacific Island contexts, but the construction of context-specific frameworks grounded in Pacific Island realities, precisely the contribution this study seeks to make.

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